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ABSTRACT

This update to a previous digest briefly describes the Internet computer network, the physical connections and communication protocols that make it possible, and the applications and information resources the network provides. The applications covered include electronic mail and listservs, the world wide web, telnet connections with remote library catalogs or databases, and file transfer protocol (FTP). Often barriers of distance, time, and cost that are significant with other forms of electronic communication are not as significant on the Internet because it accesses systems quickly regardless of proximity and because institutional users are not usually charged by level of use. Moreover, getting connected to the Internet is often not even as expensive as getting cable television. The Internet continues to evolve through formal standards development and individual or corporate software creation and enhancement. (BEW)

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February 1996

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Internet Basics: Update 1996

by Roy Tennant

This digest briefly describes the Internet computer network, the physical connections and logical agreements that make it possible, and the applications and information resources the network provides.

The Internet

The Internet is a world wide network of computer networks. It is comprised of thousands of separately administered networks of many sizes and types. Each of these networks is comprised of as many as tens of thousands of computers; the total number of individual users of the Internet is in the millions. This breadth of connectivity fosters an unparalleled opportunity for communication, collaboration, resource sharing, and information access.

Physical Connections and Logical Agreements

For the Internet to exist, there must be connections between computers and agreements on how they are to communicate. Connections can consist of a variety of communication media or methods: metal wires, microwave links, packet radio or fiber optic cables. These connections are usually established within areas or regions by the particular networking organization with authority or economic interest in that area. For example, a university academic department may use Ethernet cable to connect its personal computers and workstations into a local area network (LAN), which is then connected to the cables the campus uses to connect its buildings together. These cables are then linked to cables in a regional network, which itself ties into a national backbone which may be subsidized by the government. Therefore the path between any two points on the Internet often traverses physical connections that are administered by a variety of independent authorities.

For disparate computers (from personal computers to mainframes) to communicate over a network, there must be agreements on how that should occur. These agreements are called communication protocols. On the Internet, the Transmission Control Protocol/Internet Protocol (TCP/IP) suite of protocols defines communication at a machine-to-machine level. Application software for accomplishing specific tasks such as those outlined below is written to adhere to these standards and take advantage of the connectivity that they provide.

Electronic Mail

Electronic mail, or e-mail, is a fast, easy, and inexpensive way to communicate with other Internet users around the world. In addition, it is possible for Internet users to exchange e-mail with users of other networks such as America Online, Compuserve, Prodigy, and others. Internet users often find that the expanded capability to communicate with colleagues around the world leads to important new sources of information, collaboration, and professional development.

Besides basic correspondence between two network users, e-mail presents additional opportunities for communication. Through various methods of distributing e-mail messages to lists of "subscribers," e-mail supports electronic discussions on a wide range of topics. These discussions bring together like-minded individuals who use such forums for discussing common problems, sharing solutions, and examining issues.

The World Wide Web

Presently one of the most widespread applications on the Internet besides electronic mail is the World Wide Web. By using a Web application program (often called a "browser" or "client"), Internet users can find information on a variety of topics hosted by a number of different kinds of Internet "servers" (computers that offer information to clients) around the world. Information on the Web is presented to the user as linked "documents" comprised of text, images, and links to other computer files. Online subject directories and searchable databases of Web resources provide basic methods for locating information. The future of the Web will likely include more sophisticated ways of interacting with online information, including virtual reality (depictions of three dimensional space), video conferencing, and other kinds of online interactivity and collaboration.

Telnet

Telnet allows an Internet user in one location to establish an online connection with a computer located elsewhere. Once a connection is established with a remote computer, users can use that remote system as if their computers were hard-wired terminals of that system. Utilizing Telnet, an Internet user can establish connections with a multitude of bibliographic databases (primarily library catalogs, full-text databases, data files (e.g., statistics, oceanographic data, meteorologic data, geographic data, etc.), and other online services. Many of these systems are available for any Internet user to access and use without an account.

File Transfer (FTP)

Another application of the Internet is the ability to transfer files from one Internet-connected computer to another. This function is provided by the File Transfer Protocol (FTP) of the TCP/IP protocol suite. In a method similar to using Telnet, network users initiate an online connection with another Internet computer via FTP. But unlike Telnet, this online connection can perform only functions related to locating and transferring files. This includes the ability to change directories, list files, retrieve files, etc. Also, any World Wide Web client can download (get) files using FTP, but they generally cannot upload (put).

Types of files that can be transferred using FTP include virtually every kind of file that can be stored on a computer: text files, software programs, graphic images, sounds, files formatted for particular software programs (e.g., files with word processing formatting instructions), and others. Many computer administrators have set aside portions of their machines to offer files for anyone on the Internet to retrieve. These archive sites support "anonymous" logins that do not require an account to access, and therefore are called anonymous FTP sites.

A Premier Communications Utility

What makes the Internet truly remarkable is that ease and speed of access to information are not dependent upon proximity. An Internet user can connect to a system on the other side of the globe as easily as (and generally not much slower than) he or she can connect to a system in the next building. In addition, since many Internet users are not at present charged for their network use by their institutions, or at least are not charged by the level of their use, cost is often not a significant inhibitor of usage. Therefore the barriers of distance, time and cost, which are often significant when using other forms of electronic communication, are often less significant on the Internet.

Getting Connected

There are numerous ways to gain access to the Internet. Access options range from the low-end requirements of a computer, modem, and an account from an Internet access provider (the typical home configuration), to the high-end, which requires a computer equipped with a network card and access to an Ethernet network that is connected to the Internet (the typical business or organization configuration). Due to the relatively low cost for Internet access (often cheaper than cable TV), as well as the availability of inexpensive modems and free or inexpensive Internet software, virtually any computer user can afford to get access to the Internet and all that it provides. Those who have more money to spend on Internet access will soon see an array of fast connection options marketed to home users.

Future Possibilities

The Internet constantly evolves through both formal standards development as well as individual and corporate software creation and enhancement. What began as a U.S. government-subsidized network to allow scholars and researchers to share supercomputer resources, has since become a mainstream production network tying together commercial companies, individuals, and organizations of all kinds. Commercial use of the Internet has spurred rapid development of new software, and it is a trend that is likely to continue. Some of the developments that are likely to help transform the Internet into a ubiquitous and full-featured information appliance include virtual reality, full-motion, realtime, high quality audio and video, and advanced scripting and programming capabilities.

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